DOCUMENT RESUME

ED 470 817 IR 021 841

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TITLE Mathematical Treats Form the Stars: Integrating Curricular Elements through Partnerships between NASA and Math Methods Faculty.

PUB DATE 2002-03-00

NOTE 8p.; Paper presented at the International Conference of the Society for Information Technology & Teacher Education (13th, Nashville, TN, March 18-23, 2002).

PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)

EDRS PRICE EDRS Price MF01/PC01 Plus Postage.

DESCRIPTORS *Educational Resources; Elementary Secondary Education; Higher Education; Instructional Innovation; *Instructional Materials; *Mathematics Education; *Mathematics Materials; *Partnerships in Education

IDENTIFIERS *Mathematics Methods Program; *National Aeronautics and Space Administration

ABSTRACT

Mathematics methods coursework can be an innovative environment through which to emphasize the integration of real-world data structures and opportunities. These opportunities can create instructionally informative opportunities for learners, as well as inform teacher candidates of innovative teaching tools at their fingertips. NASA offers numerous curricular opportunities to the mathematical methods coursework, with work focusing on both PreK-12 learners as well as university learners. Such a wide array of interest levels integrate numerous learning objectives, depending upon the needs and desires of the instructors and learners whom they serve. This paper focuses on the innovative opportunities that the NASA educational entity offers to the PreK-12 as well as university mathematical methods courses. Examples are presented in links to several Web sites, which are developed by and in collaboration with scientists, engineers, educators, instructional designers, and other professionals; the sole intent of these endeavors is the support of education pertaining to the emphasis of mathematics and cross-curricular, real-world support in PreK-12 educational environments. (Author/AEF)

Title: Mathematical Treats form the Stars: Integrating Curricular Elements Through Partnerships Between NASA and Math Methods Faculty

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Note:

This manuscript was previously published in SITE2002's proceedings. Following is the reference:

Crawford, C., Brown, E., & Chilelli, C. (2002). Mathematical treats from the stars: Integrating curricular elements through partnerships between NASA and math methods faculty. In D. A. Willis, J. D. Price & N. Davis (Eds.), *Proceedings of SITE 2002 Annual - Society for Information Technology and Teacher Education* (1054-1055). Norfolk, VA: Association for the Advancement of Computing in Education (AACE).

Mathematical Treats form the Stars: Integrating Curricular Elements Through Partnerships Between NASA and Math Methods Faculty

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Introduction

Teacher candidates with a specialization area focus in mathematics maintain a working knowledge of the learning environment due to their superior university methods faculty; however, the integration of opportunities that will be available within the field are of utmost importance. NASA offers the opportunity to maintain educational excellence through partnerships with PreK-12 instructors. Such partnerships are available through out the United States of America as well as around the world. The focus of this presentation, as well as proceedings paper, will focus upon the innovative opportunities that the NASA educational entity offers to the PreK-12 as well as university mathematical methods courses. The integration of NASA's superior real world curricular abilities into math methods coursework, which offers teacher candidates opportunities to work with real-world data structures and environmental elements that would otherwise be unavailable to the majority of teacher candidates in methods courses, present professional development and learning that will then be integrated into curricular scope and sequence for future PreK-12 learners.

National Standards

The "Technology Principle" is one of six principles that the National Council of Teachers of Mathematics (NCTM) designate as imperative for all teacher candidates to master (NCTM, 2000). The "Technology Principle" states that "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning" (NCTM, http://www.nctm.org/standards/principles.htm, paragraph 28). However, the key to the success of mathematics teaching is the mathematics teachers, not the technological tools that may support the educational endeavors (Garofalo, Drier, Harper, Timmerman & Shockey, 1000; Kaput, 1992; NCTM 1991, 2000). Through the collaboration that can arise between PreK-12 education environments, higher education environments that support teacher candidates and the National Aeronautics and Space Administration (NASA), the possibilities towards supporting and realizing NCTM's "Technology Principle" are available.

NASA Educational World Wide Web Sites

There are numerous Web sites that are supported by distinct arms of NASA. Each of these Web sites delineate the orientation for each NASA campus, such as the following Web sites:

- Practical Uses of Math and Science: The On-line Journal of Math and Science Examples for Pre-College Education
  http://pumas.jpl.nasa.gov/

- InfoUse's PlaneMath

  http://www.planemath.com/

- NASA Spacelink

  http://spacelink.nasa.gov/.index.html

- NASA-JSC Distance Learning Outpost

  http://learningoutpost.jsc.nasa.gov/

- The Space Place

  http://spaceplace.jpl.nasa.gov/teachers_page.htm

- NASA Human Space Flight Metric Converter

  http://www.spaceflight.nasa.gov/station/reference/calc/index.html

- NASA-AMATYC-NSF Mathematics Explorations I and II

  http://cctc.commnet.edu/lta/

- NASA KIDS

  http://kids.msfc.nasa.gov/

- LTP Glenn Learning Technologies Project

  http://www.grc.nasa.gov/WWW/K-12/airplane/index.html

- Space Science Data Operations Office of NASA/Goddard Space Flight Center: Space Science Education

  http://ssdoo.gsfc.nasa.gov/education/education_home.html

The examples presented in the above Web sites are developed by and in collaboration with scientists, engineers, educators, instructional designers, and other professionals. The sole intent of these endeavors being the support of education pertaining to the emphasis of mathematics and cross-curricular, real-world support in PreK-12 educational environments.

Conclusions

As delineated in NCTM's "Connections" section (NCTM, 2000), "Mathematics is an integrated field of study, even though it is often partitioned into separate topics. Students from prekindergarten through grade 12 should see and experience the rich interplay among mathematical topics, between mathematics and other subjects, and between mathematics and their own interests. Viewing mathematics as a whole also helps students learn that mathematics is not a set of isolated skills and arbitrary rules" (NCTM, http://www.nctm.org/standards/standards.htm, paragraph 30). NASA has made available interactive workshops, real-world data sets and lesson plans focused upon specific levels of mathematical principles to support the educational endeavors of our education profession, and are to be commended.

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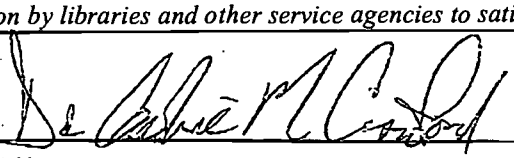
Signature: 	Printed Name/Position/Title: Dr. Caroline M. Crawford/Assistant Professor
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